Background

*Mycobacterium tuberculosis* (Mt)

- Pathogenic bacteria that causes tuberculosis (TB), a disease that affects 1/3 of the world population (CDC, 2016).
- Difficult to treat due to:
  - Intrinsic resistance of the cell membrane.
  - A complex regulatory system that responds and confers resistance to many antibiotics.

**WhiB7**

- An iron sulfur cluster-bound transcriptional regulator well conserved in mycobacteria pathogens, only found in actinobacteria.
- Responds to a variety of clinically relevant antibiotics, such as Spectomycin and kanamycin (1).
- Responds to other redox stress conditions.

Materials & Methods

- Overexpression and purification of *Mt*-WhiB7 in aerobic conditions
- Absorbance reading for purification of *Mt*-WhiB7 in reductive conditions

Results

- Overexpression and purification of SigA-WhiB7 with NiN-TA and gel filtration column:
- 410nm reading intact after 12 hours under anaerobic for both samples.
- 410nm reading decrease under oxidative conditions for both samples as is expected.

Stability of WhiB7 under anaerobic and oxidizing conditions:

- No significant loss of protein under reductive conditions.
- Similar loss of protein for *Msm*-WhiB7 and SigA-WhiB7 under oxidative conditions after 12 hours.

Future Work

- Crystallization screening of WhiB7.
- Test the redox reaction of WhiB7 with redox active molecules.

Significance & Hypothesis

- The purpose of this study is to understand the mechanism and structure of WhiB7 to provide tools against antibiotic resistance in TB.
- **Hypothesis**: A stress condition such as antibiotic treatment causes an oxidative state shift within the cell which causes a redox dependent confirmation change in WhiB7 and thus activates WhiB7.

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References
